

The New MLRS Encoder System: Progress Report

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The McDonald Laser Ranging Station (MLRS), a part of the NASA SLR network, ranges to numerous artificial satellites and the Moon. Successful lunar data acquisition requires very accurate telescope pointing and tracking. At present, absolute encoders combined with physical mount modeling provides 1 arcsecond precision lunar tracking over several minutes and reproducible pointing at the few arcseconds level. However, since the manufacturer of the yoke axis encoder no longer provides bulbs for our model, we need to be prepared to replace the system. The cost of buying a new absolute encoder with the same 0.62 arcsecond precision and the required interface upgrades makes this approach unrealistic. Our solution is to mount a linear encoder tape on the "belly" of the yoke axis, with a stationary read head mounted on the telescope frame. This incremental encoder would send pulses indicating 0.1 arcsecond steps to the existing up-down counter, maintaining resolution for the servo system while improving resolution for the telescope pointing. Although the new encoder requires zeroing after each time the system is powered down, the computer assisted procedure would require about a minute of work by the observer. This is a reasonable trade off for the factor of 10 reduction in cost. Progress on this work will be presented at the meeting.